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Original Research Article

Barriers to sustained use of the insecticide treated bed net in the upper east region of Ghana

Konlan Kennedy Diema[1]*, Konlan Kennedy Dodam[2], Millicent Aarah-Bapuah[3], Abdulai Juliana Asibi[4]

[1]University of Health and Allied Sciences, School of Nursing and Midwifery, Department of Public Health Nursing, Ho, PMB 31, Ghana
[2]West End University College, Faculty of Health, Department of Nursing, Accra, Ghana
[3]University for Development Studies, School of Allied Health Sciences, Department of Nursing, Tamale, Ghana
[4]Tamale Teaching Hospital, Tamale, Northern Region, Box 16, Ghana

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***Correspondence:**
Dr. Konlan Kennedy Diema,
E-mail: dkkonlan@uhas.edu.gh

ABSTRACT

Background: Barriers to sustainable use of the insecticide treated bed nets are responsible for the high incidence of malaria with a concomitant burden on the health delivery system in Ghana. The ITN has proven to be one of the most cost effective means of preventing malaria. This study identified the barriers to the sustainable use of the insecticide treated bed nets in the upper east region.
Methods: This was a mixed cross sectional descriptive study that used data from household representatives and interviews with malaria control officers in three randomly selected districts of the region.
Results: The study identified that apart from sleeping under the ITN and using it as window curtains and provision of warmth during cold weathers, the ITN is put in to other uses like nursing of seedlings, protecting chickens, fishing and fencing of animal pens. Major barriers to sustained use of the ITN included over complacency and the influence of male dominance. Cost of ITN, room shape and size, design of the ITN were identified as minor barriers to the use of the ITN.
Conclusions: Health care practitioners, social environmental officers and preventive health care services providers should use behavior change communication methods in curtailing most of these barriers to the sustainable use of the ITN.

Keywords: Endemic, Insecticide treated bed net, Malaria, Usage

INTRODUCTION

Malaria is hyper endemic in Ghana and the leading cause of morbidity and mortality in infants and children under five years - accounting for 22% of under-five deaths and 9% of maternal deaths in 2007.[1] The Ministry of Health (MOH) in Ghana estimates that 3 million to 3.5 million cases of suspected malaria are reported each year in public health facilities, representing 30 - 40% of all out patient attendances.[2] Of this figure over 900,000 are children under five. Malaria is also responsible for an estimated average annual reduction of 1.3% Gross Domestic Production in economic growth.[3] Reducing the malaria disease burden is a priority for the government of Ghana, MOH, the Ghana Health Service (GHS), and the National Malaria Control Programme (NMCP) but most

importantly, the general populace whose lives are severely affected.[2]

The insecticide treated bed net (ITN) have proven to be one of the most reliable and cost effective tools for the control of endemic malaria in Africa and free distribution of the net is on-going in many countries.[3] However, the fact that people do have the nets does not readily guarantee that they will eventually benefit from its specific use. A study in Burkina Faso; disclosed that although ITNs were given free to the population and education on their proper use was addressed, especially to women during the net distribution, not everyone slept under an ITN every night.[3] Most people have the capacity to protect themselves, but not everyone does so on a nightly basis.[3]

The knowledge of a people affects their behaviour and subsequently the use of the ITN. In the Kansena-Nankana District of the Upper East Region, many people associated malaria with eating sweets, standing in the sun and as 'something' one was born with.[4] Relatively few people, most of whom had some formal education, thought malaria was caused by mosquito bites.[4] Pulford et al in 2011 reviewed related literature and reported that social factors, such as sleeping elsewhere, or not sleeping at all, frequently result in mosquito net non-use. Technical factors related to mosquito net use (i.e. not being able to hang a mosquito net or finding it inconvenient to hang) and the temporary unavailability of a mosquito net (primarily due to someone else using it) was also reported. Social obstacles to mosquito net use may be addressed by complementary mosquito control strategies[5]. In Nigeria, although malaria was found to be an important disease, ITNs were believed to be only partially beneficial because of the perception that malaria had multiple causes and further to this, fear was expressed that the chemicals used to treat ITNs were associated with family planning.[6] If the ITN is used efficiently and effectively, malaria could be controlled. Although most people knew ways of preventing malaria, study findings documented that this knowledge is not used in daily practice.[6]

Problem statement

In Ghana, various interventions are used to get local communities to own and use ITN. These interventions include subsidizing the prize of the ITN in open markets through the community bed net vendor, free distribution in ante natal and post natal clinics and during vigorous malaria control crusades. As efforts are made towards the distribution of the ITN to pregnant women and children less than five years, very little significance is seen in the control of the disease in the region.[2] Malaria is still noted as the leading cause of all OPD attendances in Ghana and the Upper East Region particularly.[7] This study assessed the barriers to sustained usage of the ITN in the upper east region.

METHODS

Study design

This was a cross sectional descriptive study. It explored barriers to sustained usage of the ITN. The mixed study design allowed for the eliciting of exhaustive understanding and expression of the views of the study participants as well as the use of descriptive statistics to support expressed research findings.

Population

The Upper East Region is estimated to have a population of 1,046,545 people distributed in to thirteen Administrative Districts with 1.2 inter-censual population growth rate.[8] The targets population are mainly households that have pregnant women/woman and / or children /child under five years (vulnerable populations). Included in the study as well were District malaria control officers (DMCO). Specific districts where the study took place were the Bawku Municipality, the Bolgatanga Municipality and the Kasena Nankana East District representing the eastern segment, central strap and the western segments of the region respectively. The populations of the selected Districts are Bawku Municipality 217,791 people, Bolgatanga municipality 131,150 people and Kasena Nankana East Districts of 109,944 people.[8]

Sampling technique

The Upper East Region (the target population) was zoned in to three zones making up the eastern, central and the western zones. In each zone, Districts were selected by simple random sampling. Districts were handpicked from a collection of Districts listed in to a basket. In the eastern segment the Bawku Municipality was selected, central zone Bolgatanga municipality while in the western zone the Kasena Nankana East Districts assemblies.

Sample size

Three (3) district malaria control officers were engaged in key informant interviews (KII) (one person from each chosen district). One hundred and fifty two persons representing their individual households responded to the structured questionnaire. The inclusion criteria for selection of a household to respond to the questionnaire; for each pregnant woman and each child under five; owned at least one ITN for their household.

Data collection

The data from key informants was obtained through interviews which were audio tape recorded and transcribed verbatim. House-hold representatives either self-completed the questionnaire or were assisted by the researcher or his assistants depending on whether the

respondent could read and write. Data was collected within the period May to August 2015.

Data analysis

The digital (audio) recordings of the interviews were transcribed verbatim. Themes and patterns was then identified in the script and used as the yardstick for analysis. The structured questionnaire was analyzed using Statistical Package for Social Sciences (SPSS) version 20. Data was entered in their raw form in to Statistical Package for Social Sciences and descriptive statistics used as bases for analysis.

RESULTS

Respondents indicated that the primary use of the ITN within the household is to sleep under it during bed time to be protected from mosquitoes and subsequently malaria. Other uses of the ITN apart from sleeping under included: nursing of seedlings (19.1%), nursing of chickens (37.5%), fishing (33.6%) and 9.9% for fencing animal pens. The purpose is to wade off predators to the animals or the seedlings. ITN is effective to control malaria (43.4%) whereas 31.6% stated is not effective. Remaining 25% indicated that the ITN is only effective depending on the consistent and appropriate usage. They contend that, if the ITN is used according to the manufacturer's instructions and the advice of the health care providers, it will be effective in protecting beneficiaries from malaria.

Other means of preventing mosquitoes during bed time include; use of sprays, use of coils, physically killing mosquitoes, use of local or exotic fans, burning of herbs and use of only the insecticide treated bed net. This is shown in the Figure 1.

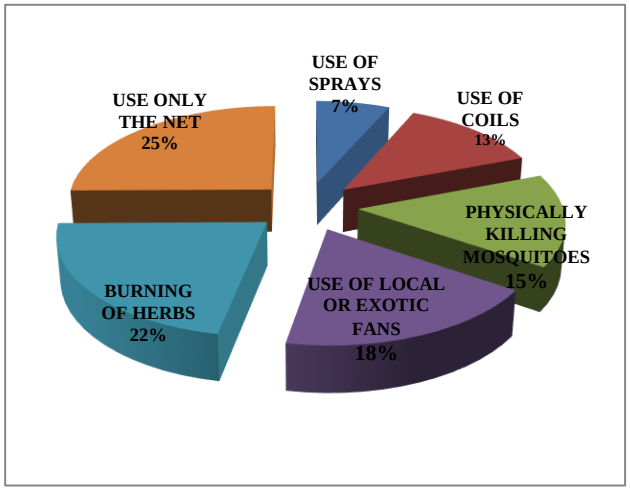

Figure 1: Means of preventing mosquitoes during bed time.

Other beneficial impact of using effectively the insecticide treated bed net within the home include; decoration of room, provision of warmth, provision of privacy and most especially preventing the nuisance effects of bites of insects and mosquitoes as shown in Figure 2 below.

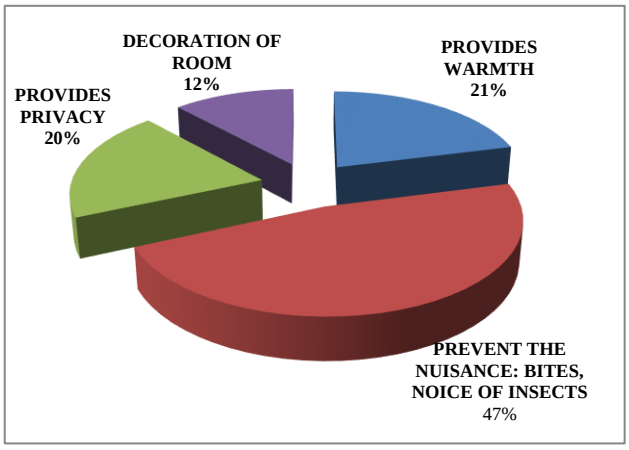

Figure 2: Other impact of the ITN.

Cost of the ITN prevents use (32.2%) while 67.8% point out that cost is not a challenge. Respondents indicated that the ITN is subsidized. Other aspects of the ITN use included it being used to provide privacy where the children and parents share a common room (20.0%), decoration of the room especially as window curtains (12.0%), provision of warmth during cold weather (21.0%) and to prevention the nuisance (bites and noise from insects) effects of insects (47.0%).

Discrepancies in the room design and shape of the ITN act as a hindrance to use (39.5%). As 60.5% think that the discrepancy in the shape of the ITN to the shape of the room does not affect sustained usage. On other means to prevent malaria, 25.0% use only the ITN, 7.0% use sprays, 13.0% use insecticide coils, and 15.0% physically kill the mosquitoes, 18% use local or exotic fans and 22.0% burn herbs.

On preferred net design, 4.6% and 20.4% preferred circular / cylindrical and rectangular / square nets respectively while the remaining 75.0% of the respondents believe that the shape of the net does not influence usage.

On challenges in hanging the net: 41.4% were challenged in hanging the net while 58.6% are not challenged. Room space was enough and local material to be used for the hanging of the ITN was readily available. Challenged by loss of potency of the ITN, 58.6% were to the affirmative. The remaining respondents indicated they will be able to retreat their ITN when it loses its potency.

Interview with malaria control officers

Major barriers to sustained use of the ITN in the region were complacency and the influence of male dominance.

Other factors included lack of access to the ITN, improper usage, lack of knowledge on usage, inappropriate treatment of the ITN. Continuous shortages of the ITN both at the regional and district medical stores and lack of access to modern health services (where the bed nets are usually distributed from) to some remote communities also accounted as barriers to distribution of the ITN.

"... Some people do not even have access to modern health facility, no CHPS compound, no clinic, not even a drug store – nothing; ... it become relatively very difficult to find this cadre of people for the distribution of the ITN" …DMCO 2

Some people do not sleep under the ITN because of claustrophobic tendencies. Claustrophobia is the feeling of being in an enclosed environment.

"*People see the bed net as small spaces that force them not to be free but feel limited even in their sleep".* DMCO 1

Other factors include lack of space and ventilation in very small rooms that accommodate a large number of people during bed times.

"Sometimes you may want to sympathize with the locals, the rooms are too small and poorly ventilated, and so you can't imagine they will be able to hang a net in them….." DMCO 3

Primarily the ITN is use to protect beneficiaries from the nuisance associated with insects including mosquitoes during bed time. While community members acknowledge this, several other uses of ITN remain imperative to them. Due to the level of ignorance and wide spread poverty, community members put the ITN to other uses apart from sleeping under them, these uses include fencing their gardens, nurseries and protecting chicken from predators while others use it for fishing.

"People say they are expired nets, but how do we know" DMCO 1

MCOs mentioned burning of herbs and / or coils, use of fans (both local and electrically empowered fans), wearing of protective clothing's during night times and physically killing mosquitoes during bed time to control mosquitoes. The goal of all these interventions is to prevent the nuisance effect produced by mosquitoes and the subsequent destruction of a good night sleep. All these measures adopted by the people were accepted by the MCOs as effective in the control of mosquitoes.

ITNs are subsidized by the NMCP through partnership with UNICEF; cost of the ITN is not seen as a major barrier to sustained usage. However, because poverty may be endemic, some people will still be challenged to raise the meager money to purchase the subsidized ITN.

"For now cost should not be a barrier to use or ownership of the ITN, however some people are so poor in this region that they cannot even afford to purchase the subsidized bed net" DMCO 2

Concerns of safety of the chemicals used as insecticides within the ITN are not barriers to sustained usage.

"*Apart from the concerns of allergy which is not wide spread, there are no dangerous effects of the net as espoused by the community members."* DMCO 3

Malaria control officers threw all assertions away and indicated that the bed net contains chemicals but in quantities, that cannot be injurious.

DISCUSSION

The primary use of the ITN within the household is to sleep under it to be protected from mosquitoes and malaria. However participants put the net to varied uses in agreement to Noboru et al. in 2008 around the Lake Victoria in the Kenya that identified the misuse of the ITN to hamper efforts made by governments and other NGOs in the fight against malaria.[9] They identified the ITN to be used for varied purposes e.g. fishing.[9] These further emphasize the economic calculations households had to make before putting the ITN to actual use. The need to protect property and animal life to the detriment of individual (human) life further highlights the region as poverty endemic. Due to the level of ignorance and wide spread poverty, community members put the ITN to other uses that will yield economic benefits apart from sleeping under them. The widespread misuses of the ITN or inappropriate use are barriers to sustained use.

Major barriers to sustained use include over complacency and the influence of male dominance. Other factors include lack of access, improper usage, and lack of knowledge on usage, claustrophobia, inappropriate handling and retreatment of the ITN.

The ITN is the only cost effective and reliable tool in the prevention of endemic malaria. However, a large proportion of respondents do not see the ITN as a reliable tool in protecting them against malaria, hence, its effective and consistent usage is likely to be hampered. The level of belief of a person of the healthy nature of a particular behaviour will aid the person to choose that healthy behaviour. The WHO has indicated that ITN usage and indoor residual spraying exercises are the two most reliable methodologies in the control of endemic malaria.[12] The perception of the people of the Region on the effectiveness of the ITN spread through two dichotomies of being effective in one end and not effective on the other. This belief that the net is not effective in the prevention of malaria eventually influences the people's choices of sleeping under the ITN or otherwise. This enhances the need as espoused by the district malaria control officers to use social

psychological models in promoting healthy behavioural choices and outcomes.

Noboru et al. in 2008 identified cost as a substantive barrier to the use of the ITN, but the findings here indicate that people get value for money in the acquisition of the ITN and also the highly subsidized nature of the ITN in the region does not make cost a major barrier.[9] In Ghana during mass malaria control campaigns, mosquito bed nets are distributed free hence may be responsible for cost not perceived as a major barrier to sustained use of the ITN. To have sustainable use of the ITN, there should be sustained sources of funding for subsidizing cost to make it possible for vulnerable populations to purchase and use.

Households interviewed had a median size of five people and each household used more than a room within the compound. Large percentage believing that room space is not a hindrance to the use of the ITN is different from what was identified by Lea et al, in 2009 that described a functional and temporal organization of house space, where its management differed between daytime and night time.[3] In the Region, most rooms have designated area for sleeping and use largely for only that and the need to remove the net after each night sleep is not required. ITN can therefore be fixed to the designated area for use over a long period of time without removing it.

The ITN comes in various shapes like rectangular and or cylindrical. Rooms in the region are also either designed to be cylindrical /circular or rectangular however during the distribution, the shape of one's room does not matter to the type of ITN given. Minority of the population indicated that the difference in the shape of the ITN to their room design acted as a hindrance to the use of the ITN. The basic concern is that the ITN must protect them from the nuisance effects of mosquitoes. Majority of the respondent in Andrew et al., in 2011 had preference for a particular design of a net for use in their homes; this study did not identify any design issues as a barrier to sustained use of the ITN.[10]

In conformity to the 1994 findings of Aikins et al, the bed net used by women with co wives with whom they share a room was to increase privacy.[11] In this study, the reason showed was married couple who shared a common room with elderly children used the bed net to increase privacy. While the net provided other advantages to beneficiaries, it also ultimately protected them from mosquitoes and other insects.

Only a quarter of the respondents used only the ITN for the prevention of malaria. This finding was also in congruence to the findings of Aikins et al. in 1994 where various means are employed by households in the prevention of malaria. The nuisance effects of mosquitoes and their subsequent destruction of sound sleep and its concomitant effects on the next day's output and general productivity ensures that community members invest large efforts towards the control of mosquitoes; the primary goal may not be to prevent malaria infection. The combination of factors in the control of mosquitoes and malaria eventually is instrumental in the reduction of the burden of malaria both to the region and the country at large.[11] The combination of all this non-conventional methods including the use of the ITN reduces significantly the chance of contracting malaria.

During a vigorous campaign of bed net usage just recently in the region, household members of the communities were educated on the means of hanging the ITN properly. This is probably responsible for majority of participants not identifying any challenge with their ability to hang the net. Pulford et al in 2011 review of related literature, identified technical factors related to mosquito net use (i.e. not being able to hang a mosquito net or finding it inconvenient to hang) and the temporary unavailability of a mosquito net (primarily due to someone else using it).[5] These Social, physical and technical obstacles to mosquito net use may be addressed by complementary mosquito control strategies that are largely already being implemented by a section of the community. These complementary mosquito control strategies include wearing of protective clothing during bed time, using local and modern fans, physically killing mosquitoes and using of mosquito coils, lotions and sprays.

CONCLUSION

All respondents understood the primary usage of the ITN to be for sleeping under it and be protected from the nuisance effects of mosquitoes. While this understanding is widespread, due to socio economic needs of the people the ITN is put in to other uses like nursing of seedlings, protecting chickens, fishing and fencing of animal pens. Major barriers to sustained use of the ITN included over complacency and the influence of male dominance. Cost of ITN, room shape and size, design of the ITN were not identified as major barriers to the use of the ITN.

The ITN apart from protecting people from mosquitoes is also used for other purposes that included used to provide privacy where the children and parents shared a common room, decoration of the room especially as window curtains, provision of warmth during cold weather while other responses indicated the other impact of the ITN to be prevention from the nuisance (bites and noise from insects) effects of insects.

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